Kepler's 3rd Law Activity **Mr. Mathras**

Do not make any marks on this paper.

Introduction: Kepler's 3rd law states that the semi-major axis of a planet's orbit (average distance to the sun in A. U.'s) is related to the planet's orbit period (in Earth-years) by the equation:

$$\mathbf{p^2 = a^3}$$

where **p** = orbital period in Earth years and **a** = distance from sun in A.U.'s.

In other words, $\mathbf{p^2/a^3 = 1}$ if Kepler's 3rd law is to hold true for all planets.

Mathematically prove the accuracy of this law by computing and recording p^2, a^3, and the value for p^2/a^3 (round answers to .01) in the following table:

planet	orbital period	semi-major axis	p^2	a^3	p^2/a^3
	(years)	(A.U.'s)			
Mercury	0.241	0.387			
Venus	0.615	0.723			
Earth	1	1			
Mars	1.881	1.524			
Jupiter	11.86	5.203			
Saturn	29.46	9.539			
Uranus	84.01	19.19			
Neptune	164.8	30.06			
Pluto	248.6	39.53			